

International Application No.: PCT/EP2003/012746
International Filing Date: November 14, 2003
PRELIMINARY AMENDMENT
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In the specification

Please insert the following paragraph at page 1, as the first paragraph:

This application is a §371 filing of PCT/EP2003/012746, filed November 14, 2003, which claims priority under 35 U.S.C. § 119 to German Patent Application No. DE 102 53 391.1 filed on November 15, 2002.

Please replace the paragraph on page 1, lines 16 to page 2, line 16, with the following paragraph:

One particular fascinating class of polymeric networks, which has been developed in recent years, are the so-called shape memory polymers (named in the following shape memory polymers, SMP or SPM materials), i.e. polymeric networks which possess in addition to their actual, visible shape at least one or even more shapes in memory. These shapes can be obtained after having been subjected to a suitable external stimulus, such as a change in temperature. Due to the purposeful shape variation, these materials are of great interest in a vast variety of applications, in which for example a variation in the size is desired. This is, for example, true for medicinal implants, which shall reach their final size preferably only after having been placed into their final position, so that the introduction of these implants requires only minimum invasive ~~ehirurgical~~ surgical processes. Such materials are for example disclosed in the international publications WO-A-99-42528 and WO-A-99-42147. One drawback of the materials disclosed there is, however, that, after subsequent cycles of shape change, it is often no longer possible to re-establish again the primary shape with the desired accuracy. Furthermore, these

materials, according to the prior art, due to irreversible creeping processes, do give rise, after repeated shape changes, to a phenomenon which can be described as "wear out", so that desired physical and geometrical properties are lost over the course of a couple of cycles. A further drawback is the semi-crystallinity of most of the materials, in particular of thermoplastic elastomers (TPE). It is, for example, in such materials not possible to distribute pharmacologically active principles, in a homogenous manner, since the permeability in the crystalline areas is much smaller than in the amorphous areas. Such inhomogeneous distribution, however, is for pharmaceutical applications, such as the controlled release of the active principle, not preferred, since it is not possible thereby to secure a constant rate of release of the active principle. Semi-crystallinity is also the reason for the heterogeneous degradation rates of the materials, since crystalline areas degrade much slower than amorphous areas. At the end of the degradation, a brittle crystalline material remains, which is easily broken and which, as implant, can give rise to inflammation. One attempt to overcome these drawbacks is the use of poly(rac-lactide), which is, contrary to poly(L-lactide) amorphous. This material has relatively stable mechanical properties (E-modulus 1400 to 2700 MPa) but this material is hardly elastic. This material can be teared torn (broken) already at an elongation of from 3 to 10%. Copolymers of lactide and glycolide, having a glycolide content of from 25 to 70 wt% are also amorphous but also suffer from the same drawback, so that this approach cannot be said as being successful.

Please replace the paragraph on page 5, lines 15-19, with the following paragraph:

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The molecular weight of the ABA-triblock copolymers 2 (macrodimethacrylate) is not critical and this molecular weight usually is from 3000 to 20000, preferably from 6400 to 10300 g/mol, as determined by ¹H-NMR. n and N and m are preferably from 10 to 50 and from 10 to 100, respectively, in particular preferably from 15 to 45 and from 50 to 75, respectively.

Please replace the paragraph on page 6, line 14 to page 7, line 7 with the following paragraph:

The reaction (introduction of terminal groups) occurs preferably using methacryloylchloride in the presence of triethyl amine in solution, for example THF as solvent. The reaction parameters required for such a reaction are known to the skilled person. The degree of functionalization, for example when introducing methacrylate terminal groups, is higher than 70%. Typically, degrees of methacryylation of 85 to 99% are obtained, wherein 100% corresponds to the complete functionalization. The intermediate products, functionalized in this manner, are suitable for the preparation of the amorphous polymeric networks in accordance with the present invention. A certain content of not completely functionalized intermediate products is not detrimental. These give rise, during the crosslinking, to loose chain ends or they are present as macrodiols non-covalently crosslinked within the network. Loose chain ends as well as macrodiols are not detrimental, as long as their content is not too high. Degrees of functionalization in the range of ~~from~~ from 70 to 100% enable the preparation of polymeric amorphous networks in accordance with the present invention. The preferred range of the

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molecular weight of the preferred poly(lactide)-b-poly(propyleneoxide)-b-poly(lactide)-dimethacrylate 2 is from 6400 to 10300 g/mol.

Please replace the table on page 13 with the following table:

Example	Tg1 (°C)	Tg2 (°C)	E-Modulus at 22°C (MPa)	Elongation at break at 22°C (%)	Strain at break at 22 °C (MPa)
1	-51	7	1,24 <u>1.24</u>	128	1,43 <u>1.43</u>
2	-60 (-43*)	4 (11*)	2,02 <u>2.02</u>	71	0,94 <u>0.94</u>
3	-46	n. d.	1,38 <u>1.38</u>	218	2,18 <u>2.18</u>
4	-50	15	4,17 <u>4.17</u>	334	5,44 <u>5.44</u>
5	-59 (-45*)	7 (33*)	4,54 <u>4.54</u>	110	1,89 <u>1.89</u>
6	-62 (-49*)	29 (43*)	6,37 <u>6.37</u>	210	3,92 <u>3.92</u>

Please replace the table on page 14 with the following table:

Example	Strain fixity (%)	Strain recovery after 5 cycles (%)*	Temperature range of transition (°C)	Start temperature of transition	[End temperature of transition]
1	92,9 <u>92.9</u>	87,5 <u>87.5</u>	27	-2	25
2	96,0 <u>96.0</u>	94,1 <u>94.1</u>	37	2	39
3	92,0 <u>92.0</u>	102,2 <u>102.2</u>	29	16	45